



07-13-00  
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July 12, 2000

Asst. Commissioner for Patents  
Washington, DC 20231

Attn: Patent Application Branch

RE: Filing of Patent Application  
**"EXPRESS MAIL" LABEL NUMBER: EL175652476US**  
Our File C4-860


Dear Sir:

Enclosed for filing is a patent application of Edwin S. Thompson, William A. Crable, Jr., Christopher M. Mullins, Leroy Davis, Gregory Gelman, Robert E. Germain, Albert Harding and Harold Johnson for a CONNECTION APPARATUS FOR CCTV SYSTEMS, the application comprising a Specification of 15 pages; 50 numbered Claims, including 11 Independent Claims; 8 sheets of Informal Drawings (Figures 1-10); an Abstract and our check in the amount of \$1,854.00 in payment of the filing fee which has been calculated as follows; \$690.00 base filing; \$624.00 for eight Independent claims in excess of three and \$540.00 for thirty claims in excess of twenty.

Also enclosed are a "Combined Declaration and Power of Attorney for Patent Application" and an "Assignment," as well as a "Recordation Form Cover Sheet" and our check in the amount of \$40.00.

Authorization is given for the charging of any further fee for effecting filing to our Deposit Account 18-1644.

Respectfully submitted,

  
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C4-860

CONNECTION APPARATUS FOR CCTV SYSTEMS

FIELD OF THE INVENTION

5        This invention relates generally to electrical connection apparatus and pertains more particularly to connection apparatus for use in CCTV (closed circuit television) systems for surveillance applications.

BACKGROUND OF THE INVENTION

10        Known CCTV systems for surveillance applications typically include plural video cameras disposed at locations of interest and a connection apparatus having a so-called "back panel" with input connectors in number corresponding to the plurality of video cameras. Cables extending from the video cameras are terminated  
15 with a so-called "BNC" jack connector and the back panel input connectors are BNC socket connectors each receiving one of the cable jack connectors.

20        In one type of known CCTV systems for surveillance application, the BNC socket connectors are in turn individually connected by discrete wiring to input terminals of an electronic signal processing circuit (typically a printed circuit board (PCB)) which processes the camera video signals. Output terminals of the electronic processing circuit are connected by further discrete wiring to back panel output connectors.

25        The above-described type of known CCTV system presents great difficulties where the need for repair arises with respect to the electronic signal processing circuit thereof, i.e., the need for

correction of a fault occurring therein. Thus, in order to remove the PCB for testing, all of the discrete wire connections (input and output) to the PCB need to be separated, and all of the wires and PCB connectors need to be suitably identified for subsequent  
5 reconnection.

In a second known type of CCTV system for article surveillance, the foregoing repair difficulties are overcome by providing a separable connection within the connection apparatus. In this type of connection apparatus, the electronic signal  
10 processing circuit is provided in the form of a plurality of PCBs each having a card edge male connection part. The discrete wiring from the back panel input and output connectors terminates at a plurality of card edge receiving connectors. Where repair of a PCB is required, the PCB is simply removed from its connector so that  
15 disconnection of discrete wiring between the back panel connectors and the card edge receiving connectors is not necessary.

While the second described type of connection apparatus thus has an advantage over the first described connection apparatus type, both types, and all other known CCTV connection apparatus,  
20 have a common failing, as will be described in the following discussion.

In all known CCTV system connection apparatus, the back panel includes a rectangular member having minimum x and y dimensions dictated by the number of input/output connectors. The rectangular  
25 member is supported at the rear of an open parallelepiped housing

extending along the z-axis. The discrete wiring extends along the z-axis to the electronic signal processing circuit (or to the card edge connectors in the second above-discussed apparatus). The electronic signal processing circuit likewise extends along the z-axis.

From applicant's perspective, known CCTV connection apparatus, being dictated by the geometry above discussed, does not address the trend toward more and more participating cameras (more and more back plane connectors and xy area) and the ever diminishing size of electronic signal processing circuitry. Rather, the present undesired volume of connection apparatus (monitoring station real estate being presently excessive) is seen as only likely to further spiral.

#### SUMMARY OF THE INVENTION

The present invention has as its primary object the provision of CCTV surveillance system connection apparatus which overcomes the foregoing disadvantages of presently known apparatus.

In attaining such object, the invention provides, in a first aspect, a video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in a matrix having connector contact rows and connector contact columns, the individual video signal connector contacts extending in a first connection direction;

(b) a connector having individual connector contacts corresponding in number to the individual video signal connector

contacts of the array, the individual connector contacts extending in a second connection direction, the second connection direction being orthogonal to the first connection direction; and

(c) conductors interconnecting the individual video signal  
5 connector contacts to the individual connector contacts.

In attaining such object, the invention provides, in a second aspect, a video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in a matrix having connector contact rows and connector  
10 contact columns, the individual video signal connector contacts extending in a first connection direction;

(b) a first connector having individual connector contacts corresponding in number to the individual video signal connector contacts of the array, the individual connector contacts extending  
15 in a second connection direction, the second connection direction being orthogonal to the first connection direction;

(c) conductors interconnecting the individual video signal connector contacts to the individual connector contacts;

(d) a second connector having individual connector contacts  
20 electrically engaged with the individual connector contacts of the first connector and extending in the second connection direction; and

(e) a signal processing unit connected to the individual connector contacts of the second connector and aligned with the  
25 individual connector contacts of the first and second connectors.

In attaining such object, the invention provides, in a third aspect, a video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in an x-axis, y-axis matrix, the array individual video signal connector contacts extending in a z-axis direction;

(b) a connector having individual connector contacts corresponding in number to the individual video signal connector contacts of the array, the individual connector contacts extending in the direction of the y-axis; and

(c) conductors interconnecting the individual video signal connector contacts of the array to the individual connector contacts.

In attaining such object, the invention provides, in a fourth aspect, a video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in an x-axis, y-axis matrix, the array individual video signal connector contacts extending in a z-axis direction;

(b) a connector having individual connector contacts corresponding in number to the individual video signal connector contacts of the array, the individual connector contacts extending in the direction of the x-axis; and

(c) conductors interconnecting the individual video signal connector contacts of the array to the individual connector contacts.

In attaining such object, the invention provides, in a fifth aspect, a video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in a matrix having connector contact rows and connector contact columns, the individual video signal connector contacts extending in a first connection direction;

5 (b) a first substrate supporting the individual video signal connector contacts, the first substrate extending in a second connection direction, the second connection direction being orthogonal to the first connection direction; and

(c) a signal processing unit supported on a second substrate,  
10 a portion of the second substrate being juxtaposed with a portion of the first substrate along the second connection direction.

In a still further aspect, the invention provides improvement of a CCTV system comprising N video cameras, a back panel having N  
15 connectors for receiving video output signals of the N video cameras, and M multiplexers connected to the back panel N connectors, M being a submultiple of N, wherein the M multiplexers are supported on a common substrate and latching means is provided for mutually securing the substrate and the back panel, the  
20 latching means being user operable for releasing the securement of the substrate and the back panel.

The invention will be further understood from consideration of the following description of preferred embodiments thereof and from the drawings where like reference numerals identify like parts  
25 throughout.

## DESCRIPTION OF THE DRAWINGS

Fig. 1 is an explanatory view generally depicting the above-discussed second known type of CCTV system for article surveillance.

5 Fig. 2 is a front elevation of a first embodiment of video signal connection apparatus in accordance with the invention.

Fig. 3 is a side elevation of the Fig. 2 showing.

Fig. 4 is a side elevation of a second embodiment of video signal connection apparatus in accordance with the invention.

10 Fig. 5 is a front elevation of a third embodiment of video signal connection apparatus in accordance with the invention.

Fig. 6 is a front elevation of a fourth embodiment of video signal connection apparatus in accordance with the invention.

Fig. 7 is a side elevation of the Fig. 6 showing.

15 Fig. 8 is a perspective view of a fifth, particularly preferred, embodiment of video signal connection apparatus in accordance with the invention.

Figs. 9(a) and 9(b) show a releasable latching mechanism for the Fig. 8 embodiment.

20 Fig. 10 is a schematic diagram of selected components of a CCTV system arranged in accordance with the invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1, an explanatory view generally depicting the above-discussed second known type of CCTV system for article  
25 surveillance, shows in exploded fashion video signal connection



apparatus 10. Apparatus 10 includes a generally boxed-shaped chassis 12, having back panel 14, which defines a plurality of slots, one being shown at 14a, for the receipt and retention of I/O connection contact units, one being shown at 16, comprising a substrate 18, from which a plurality of video signal connector contacts, i.e., I/O video signal connector contacts, one such contact being shown at 18a, in the form of a BNC male contact connectable with a female contact (not shown) of a video camera (not shown).

Interiorly of chassis 12 are supported connectors, one being shown at 20, for interconnection with the I/O connection contact units through conductors, conductor 22 being shown for connection of connection contact 18a to connector 20.

The I/O video signal connector contacts, e.g., contact 18a, extend along a connection direction coincident with the z-axis and the conductors, e.g., conductor 20a, extend generally along such z-axis connection direction to connector 22. Signal processing units, one being shown at 24, are movable along the z-axis for insertion into and removal from connector 22. Signal processing unit 24 may typically be in the form of a PCB unit having circuit board 24a and card edge connector 24b connectably seatable in I/O connection unit 22.

The z-axis dimension, or depth, of chassis 12 will be seen to be dictated by the depth of back panel 14, the z-axis length of conductor 20, connector 22 and signal processing unit 24. The x- and y- axis dimensions of chassis 12 will be seen to be dictated by

the number of I/O connection contact units 16. As also alluded to above, while the signal processing unit is constantly diminishing in size with advantages in technology, only that portion of the z-axis dimension of chassis 12 is diminished thereby. Such volume  
5 dictation in video connection apparatus is overcome in the subject invention, as will be seen from the following discussion.

Referring to Figs. 2 and 3, video signal connection apparatus 26 includes an array 28 of individual video signal connector contacts 30, arranged in a matrix having connector contact rows and  
10 connector contact columns, the individual video signal connector contacts extending in a first connection direction, i.e., along the z-axis. Contacts 30 are supported in common by substrate 32. The full z-axis dimension of apparatus 26 is thus the sum of the z-axis dimensions of contacts 30 and substrate 32. Interiorly of  
15 substrate 32 are conductors 34 which extend in a second connection direction which is orthogonal to the first connection direction. Thus, conductors 34 run along the y-axis (vertically) to first connector 36.

First connector 36 has individual connector contacts 38  
20 corresponding in number to the individual video signal connector contacts of the array. Connector contacts 38 also extend in the second connection direction.

Second connector 40 has individual connector contacts 42 electrically engaged with individual connector contacts 38 of first  
25 connector 36, extending in the second connection direction.

Signal processing unit 44 is connected to individual connector contacts 42 of second connector 40.

While array 28 of individual video signal connector contacts 30 is shown illustratively as a four-by-three matrix, the matrix may be of any desired size, e.g., the customary eight-by-six matrix allowing for the connection apparatus and user apparatus to communicate with forty-eight individual video cameras. As will be appreciated, such expansion of the connector contact array gives rise only to an increase in the xy area of the substrate-contact component of apparatus 26 and, where the substrate-contact component is wall-mounted, no incursion is made on real estate (counter top) where system monitoring equipment is disposed.

Returning again to Figs. 2 and 3, first connector 36 and second connector 40 are separable from one another, second connector 40 being removable from video signal connection apparatus 26 with signal processing unit 44 upon separation of the first and the second connectors.

Turning to Fig. 4, video signal connection apparatus 48 is constituted by the same components as above discussed in connection with Figs. 2 and 3 except for its substrate 50 and releasable connection device 52.

Substrate 50 has a longer dimension along the y-axis than does substrate 32, substrate 50 extending jointly in the second connection direction with at least a portion of signal processing unit 44, whereby the latter may be supported by the former through

connection device 52, which may be comprised of releasable mechanical connectors at opposite lateral (x-axis) margins of connection apparatus 48 on each of substrate 50 and signal processing unit 44.

5       Turning to Fig. 5, connection apparatus 54 is configured in large part comparably with connection apparatus 26 of Figs. 1 and 2 as indicated by the common reference numerals. However, a system expansion device 56 is provided and is connected to first connector 36 by third connector 58 and to second connector 42 through fourth  
10 connector 60. Individual contacts of connector 58 are connected to individual contacts of fifth connector 62, which makes all generated video camera output signals fed to contacts 30 available to user apparatus (not shown) of any desired type, e.g., memory means, recording means and networking means.

15       Turning to Figs. 6 and 7, connection apparatus 64 is configured with the same components as connection apparatus 26 of Figs. 1 and 2, however, with the contacts of connectors 36 and 42 and conductors connecting contacts 30 to contacts of connector 36 extending in a y-axis connection direction.

20       Connection apparatus 66 of Fig. 8 embodies a back panel substrate 68 having the array of contacts 30 and various other contacts and connectors usable in CCTV surveillance systems. Cover 70 encloses the connection apparatus signal processing circuitry and is slidably mounted on substrate 68 for downward and upward  
25 movement. At the limit of upward movement of cover 70, the cover

and enclosed signal processing circuitry are latched into an operating position by a latch mechanism. To remove the cover and enclosed signal processing circuitry from the substrate, a user operates a release (unlatching) button (discussed below) located in  
5 recessed access slot 72, jointly with a like release button (not shown) at the left margin of cover 70.

Turning to Fig. 9(a), recessed access slot 72 includes release button 74, which is movable in channel 76 and locking (latching) button 78. Leftward movement of release button 74 moves locking  
10 button 78 leftwardly and out of engagement with a locking aperture (not shown) in substrate 68. As noted, the same activity occurs at the left margin of cover 70, and the cover may now be removed by downward sliding movement.

Turning to Fig. 9(b), buttons 74 and 78 are part of spring  
15 clip 80, which is secured to the back panel. When button 78 is moved leftwardly to its release position, it remains in a preloaded state, waiting for the next locking requirement.

Referring again to the prior art showing of Fig. 1, the arrangement includes plural of connectors 20 and plural of signal  
20 processing units 24. Upon removal of all of the plural signal processing units, the possibility exists, upon reinsertion thereof, for insertion of a signal processing unit in a connector assigned to another signal processing unit. This problem is overcome by the arrangement of the invention shown in Fig. 10.

Referring now to Fig. 10, the CCTV system depicted therein includes the aforementioned interconnectable connectors 36 and 40 and further interconnectable connectors 82 and 84. Back panel 86 includes the six-by-eight row/column array 68 of Fig. 8 of individual video signal connector contacts 30, one row being depicted as connected to connector 36 by conductors 36a through 36h.

Back panel 86 further includes connectors 88 through 98, connected individually to connector 82 by conductors 100 through 110.

Signal processing unit 44 includes conductors 112 for connecting matrix switch 114 to connector 40. Matrix switch 114 furnishes output signals to signal processing means, e.g., output signals to multiplexer 116 (MUX 1) over lines 118, output signals to multiplexer 120 (MUX 2) over lines 122, and output signals to multiplexer 124 (MUX 1) over lines 126.

Output signals of multiplexer 116 are conveyed over lines 128 and 130 to connector 84. Output signals of multiplexer 120 are conveyed over lines 132 and 134 to connector 84. Output signals of multiplexer 124 are conveyed over lines 136 and 138 to connector 84.

Latching buttons 78 and 78' of Fig. 10 are provided at righthand and lefthand margins of the cover (not shown) of signal processing unit 44.

Connector 88 may be connectable to a connector of a monitor for multiplexer 116, and connector 90 may be connectable to a connector for a VCR for multiplexer 116. Connector 92 may be connectable to a connector of a monitor for multiplexer 120 and  
5 connector 94 may be connectable to a connector for a VCR for multiplexer 120. Connector 96 may be connectable to a connector of a monitor for multiplexer 124, and connector 98 may be connectable to a connector for a VCR for multiplexer 124.

In the Fig. 10 arrangement, the entirety of a CCTV system  
10 signal processing unit (44) is removable and reattachable to a back panel collectively, unlike the arrangement of Fig. 2, for example.

Accordingly, the reattachment error possibilities inherent in the Fig. 2 arrangement are avoided in the Fig. 10 arrangement.

Viewed otherwise, the arrangement of Fig. 10 provides  
15 improvement of a CCTV system comprising N video cameras, a back panel having N connectors for receiving video output signals of the N video cameras, and M multiplexers connected to the back panel N connectors, M being a submultiple of N, wherein the M multiplexers are supported on a common substrate and mechanical latching means  
20 is provided for mutually securing the substrate and the back panel, the latching means being user operable for releasing the securement of the substrate and the back panel.

Various changes to the particularly depicted embodiment of the invention may be introduced without departing from the scope of the  
25 invention. Accordingly, it is to be appreciated that the

particularly disclosed embodiments are intended in an illustrative, and not in a limiting, sense. The true spirit and scope of the invention is set forth in the ensuing claims.



WHAT IS CLAIMED IS:

1. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in connector rows along an x-axis and connector columns  
5 along a y-axis;

(b) a first connector having individual connector contacts corresponding in number to said individual video signal connector contacts of said array;

(c) conductors interconnecting said individual video signal  
10 connector contacts to said individual connector contacts;

(d) a second connector having individual connector contacts electrically engaged with said individual connector contacts of said first connector; and

(e) a signal processing unit connected to said individual  
15 connector contacts of said second connector,

said first connector and said second connector being aligned along one of said x-axis and said y-axis.

2. The video signal connection apparatus claimed in claim 1,  
where at least some portion of each of said conductors is aligned  
20 with said first connector and said second connector.

3. The video signal connection apparatus claimed in claim 1,  
wherein said signal processing unit is aligned with said first  
connector and said second connector.

4. The video signal connection apparatus claimed in claim 2,  
25 wherein said signal processing unit is aligned with said first  
connector and said second connector.

5. A video signal connection apparatus, comprising:

(a) an array of individual video signal connector contacts arranged in connector rows along an x-axis and connector columns along a y-axis;

5 (b) a first connector having individual connector contacts corresponding in number to said individual video signal connector contacts of said array;

(c) conductors interconnecting said individual video signal connector contacts to said individual connector contacts;

10 (d) a second connector having individual connector contacts electrically engaged with said individual connector contacts of said first connector; and

(e) a signal processing unit connected to said individual connector contacts of said second connector,

15 video signal contacts of a row of said array of individual video signal connector contacts, said first connector, said second connector and said signal processing unit being disposed in linewise succession.

6. A video signal connection apparatus, comprising:

20 (a) an array of individual video signal connector contacts arranged in connector rows along an x-axis and connector columns along a y-axis;

(b) a first connector having individual connector contacts corresponding in number to said individual video signal connector  
25 contacts of said array;

(c) conductors interconnecting said individual video signal connector contacts to said individual connector contacts;

(d) a second connector having individual connector contacts electrically engaged with said individual connector contacts of  
5 said first connector; and

(e) a signal processing unit connected to said individual connector contacts of said second connector,

video signal contacts of a column of said array of individual video signal connector contacts, said first connector, said second  
10 connector and said signal processing unit being disposed in  
linewise succession.

7. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in a matrix having connector rows and connector columns;

15 (b) a first connector having individual connector contacts corresponding in number to said individual video signal connector contacts of said array, said individual connector contacts being connected individually to said individual video signal connector contacts; and

20 (c) a system expansion device having individual input contacts corresponding in number to said individual connector contacts and connected therewith, and first and second sets of output contacts, each output contact set having output contacts corresponding in number to said individual input contacts of said system expansion  
25 device, each output contact of each output contact set being

connected to an individual one of said individual input contacts of said system expansion device.

8. The video signal connection apparatus claimed in claim 7, wherein contacts of said array extend in a first connection  
5 direction and wherein said individual input contacts of said system expansion device extend in a second connection direction orthogonal to said first connection direction.

9. The video signal connection apparatus claimed in claim 7, wherein said output contacts of said first output contact set of  
10 said system expansion device extend in a connection direction orthogonal to a connection direction of said output contacts of said second output contact set of said system expansion device.

10. The video signal connection apparatus claimed in claim 8, wherein said output contacts of said first output contact set of  
15 said system expansion device extend in a connection direction orthogonal to a connection direction of said output contacts of said second output contact set of said system expansion device.

11. The video signal connection apparatus claimed in claim 7, further including conductors interconnecting said individual  
20 connector contacts to said individual video signal connector contacts of said array, said conductors extending in said second connection direction.

12. The video signal connection apparatus claimed in claim 8, further including conductors interconnecting said individual  
25 connector contacts to said individual video signal connector

contacts of said array, said conductors extending in said second connection direction.

13. The video signal connection apparatus claimed in claim 9, further including conductors interconnecting said individual  
5 connector contacts to said individual video signal connector contacts of said array, said conductors extending in said second connection direction.

14. The video signal connection apparatus claimed in claim 10, further including conductors interconnecting said individual  
10 connector contacts to said individual video signal connector contacts of said array, said conductors extending in said second connection direction.

15. The video signal connection apparatus claimed in claim 7, further including a second connector having an input contact set  
15 having contacts corresponding in number to said output contacts of said system expansion device first contact set and connected therewith.

16. The video signal connection apparatus claimed in claim 15, further including a signal processing unit connected to said input  
20 contacts of said second connector contact set.

17. The video signal connection apparatus claimed in claim 15, wherein said contacts of said second connector input contact set extend in said second connection direction.

18. The video signal connection apparatus claimed in claim 16,  
25 wherein said system expansion device is separable from said first

connector and wherein said signal processing unit is separable from said system expansion device.

19. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts  
5 arranged in connector rows along an x-axis and connector columns along a y-axis;

(b) a first connector having individual connector contacts corresponding in number to the individual video signal connector contacts of the array;

10 (c) conductors interconnecting the individual video signal connector contacts to the individual connector contacts;

(d) a second connector having individual connector contacts electrically engaged with the individual connector contacts of the first connector; and

15 (e) a signal processing unit connected to the individual connector contacts of the second connector,

said first connector and the second connector being aligned along one of the x-axis and the y-axis.

20. A video signal connection apparatus comprising:

20 (a) an array of individual video signal connector contacts arranged in a matrix having connector rows and connector columns, said individual video signal connector contacts extending in a first connection direction;

(b) a connector having individual connector contacts  
25 corresponding in number to said individual video signal connector

contacts of said array, said individual connector contacts extending in a second connection direction, said second connection direction being orthogonal to said first connection direction; and

(c) conductors interconnecting said individual video signal  
5 connector contacts to said individual connector contacts.

21. The video signal connection apparatus claimed in claim 20,  
further comprising a second connector having individual connector  
contacts electrically engaged with said individual connector  
contacts of said first-mentioned connector and extending in said  
10 second connection direction.

22. The video signal connection apparatus claimed in claim 21,  
further comprising a signal processing unit connected to said  
individual connector contacts of said second connector.

23. The video signal connection apparatus claimed in claim 22,  
15 wherein said first-mentioned and said second connectors are  
separable from one another, said second connector being removable  
from said video signal connection apparatus with said signal  
processing unit upon separation of said first-mentioned and said  
second connectors.

20 24. The video signal connection apparatus claimed in claim 22,  
wherein said individual video signal connector contacts are  
supported on a substrate, said substrate extending jointly in said  
second connection direction with at least a portion of said signal  
processing unit.

25. The video signal connection apparatus claimed in claim 24,  
further comprising releasable interlocking means disposed on said  
substrate at the location of said at least a portion of said signal  
processing unit for releasably interlocking said signal processing  
5 unit to said substrate.

26. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts  
arranged in a matrix having connector rows and connector columns,  
said individual video signal connector contacts extending in a  
10 first connection direction;

(b) a first connector having individual connector contacts  
corresponding in number to said individual video signal connector  
contacts of said array, said individual connector contacts  
extending in a second connection direction, said second connection  
15 direction being orthogonal to said first connection direction;

(c) conductors interconnecting said individual video signal  
connector contacts to said individual connector contacts;

(d) a second connector having individual connector contacts  
electrically engaged with said individual connector contacts of  
20 said first connector and extending in said second connection  
direction; and

(e) a signal processing unit connected to said individual  
connector contacts of said second connector and aligned with said  
individual connector contacts of said first and second connectors.



27. The video signal connection apparatus claimed in claim 26,  
wherein said first and said second connectors are separable from  
one another, said second connector being removable from said video  
signal connection apparatus with said signal processing unit upon  
5 separation of said first and said second connectors.

28. The video signal connection apparatus claimed in claim 26,  
wherein said individual video signal connector contacts are  
supported on a substrate, said substrate extending jointly in said  
second connection direction with at least a portion of said signal  
10 processing unit.

29. The video signal connection apparatus claimed in claim 28,  
further comprising releasable interlocking means disposed on said  
substrate at the location of said at least a portion of said signal  
processing unit for releasably interlocking said signal processing  
15 unit to said substrate.

30. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts  
arranged in an x-axis, y-axis matrix, said array individual video  
signal connector contacts extending in a z-axis direction;

20 (b) a connector having individual connector contacts  
corresponding in number to said individual video signal connector  
contacts of said array, said individual connector contacts  
extending in the direction of said y-axis; and

(c) conductors interconnecting said individual video signal  
25 connector contacts of said array to said individual connector  
contacts.

31. The video signal connection apparatus claimed in claim 30,  
further comprising a second connector having individual connector  
contacts electrically engaged with said individual connector  
contacts of said first connector and extending in the direction of  
5 said y-axis.

32. The video signal connection apparatus claimed in claim 31,  
further comprising a signal processing unit connected to said  
individual connector contacts of said second connector.

33. The video signal connection apparatus claimed in claim 32,  
10 wherein said first and second connectors are separable from one  
another, said second connector being removable from said video  
signal connection apparatus with said signal processing unit upon  
separation of said first and second connectors.

34. The video signal connection apparatus claimed in claim 32,  
15 wherein said individual video signal connector contacts of said  
array are supported on a substrate, said substrate extending  
jointly with at least a portion of said signal processing unit.

35. The video signal connection apparatus claimed in claim 34,  
20 further comprising releasable interlocking means disposed on said  
substrate at the location of said at least a portion of said signal  
processing unit for releasably interlocking said signal processing  
unit to said substrate.

36. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts

arranged in an x-axis, y-axis matrix, said array individual video signal connector contacts extending in a z-axis direction;

(b) a connector having individual connector contacts corresponding in number to said individual video signal connector contacts of said array, said individual connector contacts extending in the direction of said x-axis; and

(c) conductors interconnecting said individual video signal connector contacts of said array to said individual connector contacts.

10 37. The video signal connection apparatus claimed in claim 36, further comprising a second connector having individual connector contacts electrically engaged with said individual connector contacts of said first connector and extending in the direction of said x-axis.

15 38. The video signal connection apparatus claimed in claim 37, further comprising a signal processing unit connected to said individual connector contacts of said second connector.

20 39. The video signal connection apparatus claimed in claim 38, wherein said first and second connectors are separable from one another, said second connector being removable from said video signal connection apparatus with said signal processing unit upon separation of said first and second connectors.

25 40. The video signal connection apparatus claimed in claim 38, wherein said individual video signal connector contacts of said array are supported on a substrate, said substrate extending jointly with at least a portion of said signal processing unit.

41. The video signal connection apparatus claimed in claim 40, further comprising releasable interlocking means disposed on said substrate at the location of said at least a portion of said signal processing unit for releasably interlocking said signal processing unit to said substrate.

42. A video signal connection apparatus comprising:

(a) an array of individual video signal connector contacts arranged in a matrix having connector rows and connector columns, said individual video signal connector contacts extending in a first connection direction;

(b) a first substrate supporting said individual video signal connector contacts, said first substrate extending in a second connection direction, said second connection direction being orthogonal to said first connection direction; and

(c) a signal processing unit supported on a second substrate, a portion of said second substrate being juxtaposed with a portion of said first substrate along said second connection direction.

43. In a CCTV system comprising N video cameras, a back panel having N connectors for receiving video output signals of said N video cameras, and M signal processors connected to said back panel N connectors, M being a submultiple of N, the improvement wherein said M signal processors are supported on a common substrate and latching means is provided for mutually securing said substrate and

said back panel, said latching means being user operable for releasing the securement of said substrate and said back panel.

44. The invention claimed in claim 43, wherein said common substrate includes a cover secured thereto, said latching means  
5 being disposed on said back panel and being engageable with said cover at opposite side margins of said cover.

45. The invention claimed in claim 44, wherein said latching means is accessible exteriorly of said cover for operation of said latching means.

10 46. The invention claimed in claim 43, wherein said back panel includes first and second connectors matable with third and fourth connectors disposed on said substrate.

15 47. The invention claimed in claim 43, wherein said first connector is connected to said back panel N connectors and said second connector is connected to input terminals of said M signal processors.

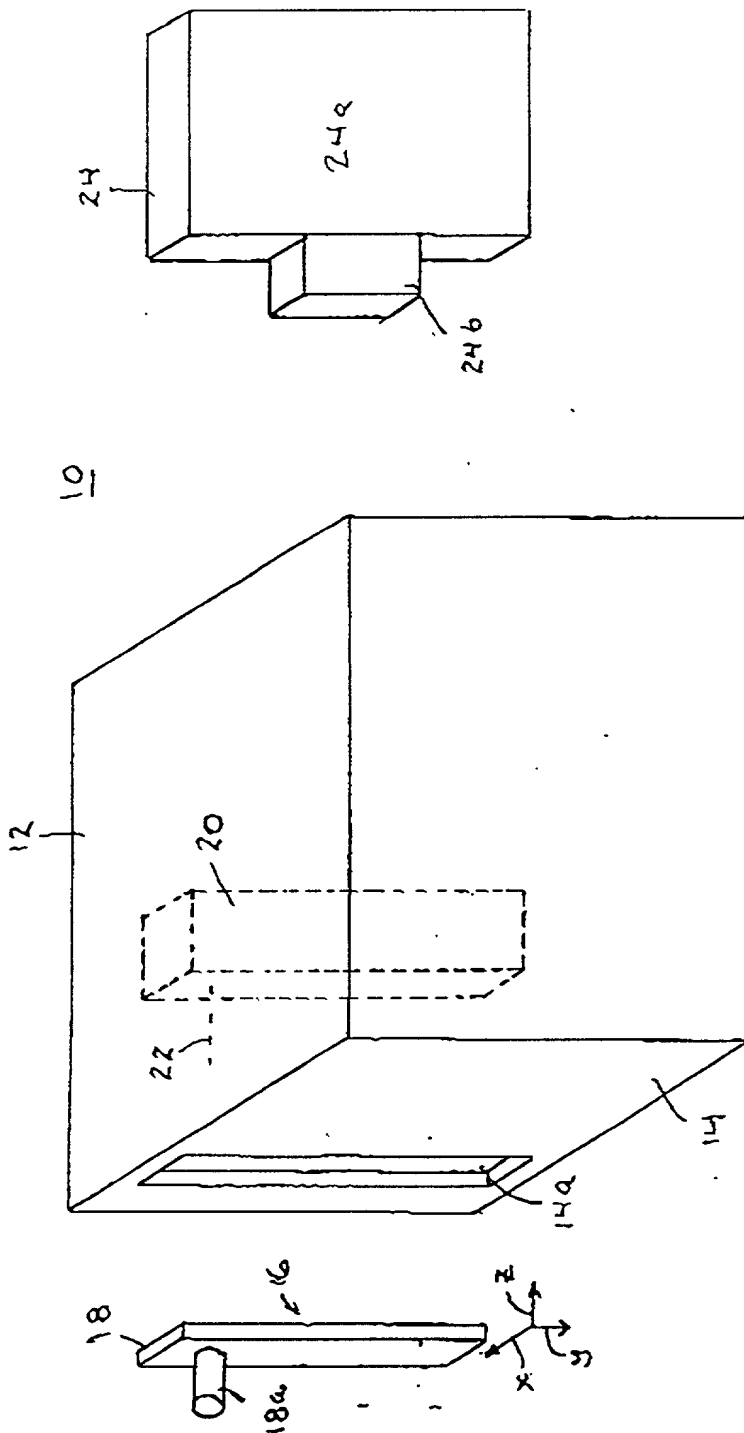
20 48. The invention claimed in claim 47, wherein said back panel includes further connectors and wherein output signals of said M signal processors are connected through said third and fourth connectors to said further connectors of said back panel.

49. The invention claimed in claim 45, wherein said latching means is accessible through recesses extending inwardly from side margins of said cover.

25 50. The invention claimed in claim 45, wherein said M signal processors are multiplexers.

# ABSTRACT OF THE DISCLOSURE

A video signal connection apparatus comprises an array of individual video signal connector contacts arranged in a matrix having connector contact rows and connector contact columns, the  
5 individual video signal connector contacts extending in a first connection direction, a connector having individual connector contacts corresponding in number to the individual video signal connector contacts of the array, the individual connector contacts extending in a second connection direction, the second connection  
10 direction being orthogonal to the first connection direction and conductors interconnecting the individual video signal connector contacts to the individual connector contacts.



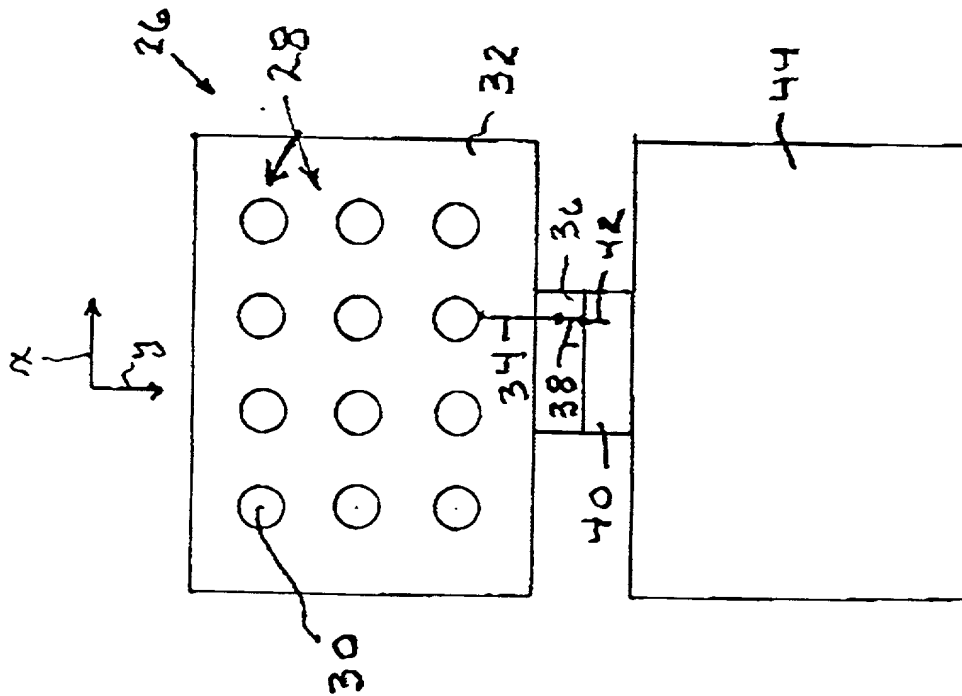


FIG. 2

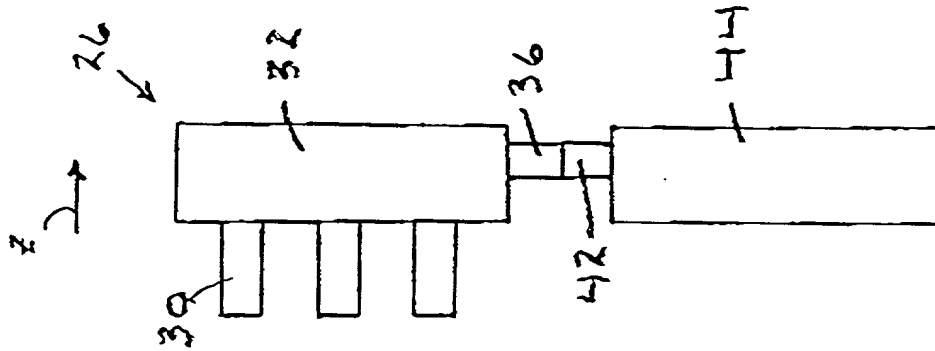


FIG. 3

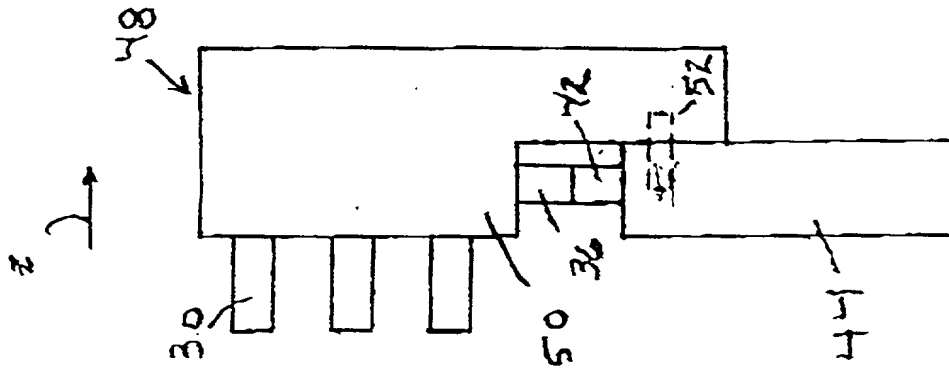
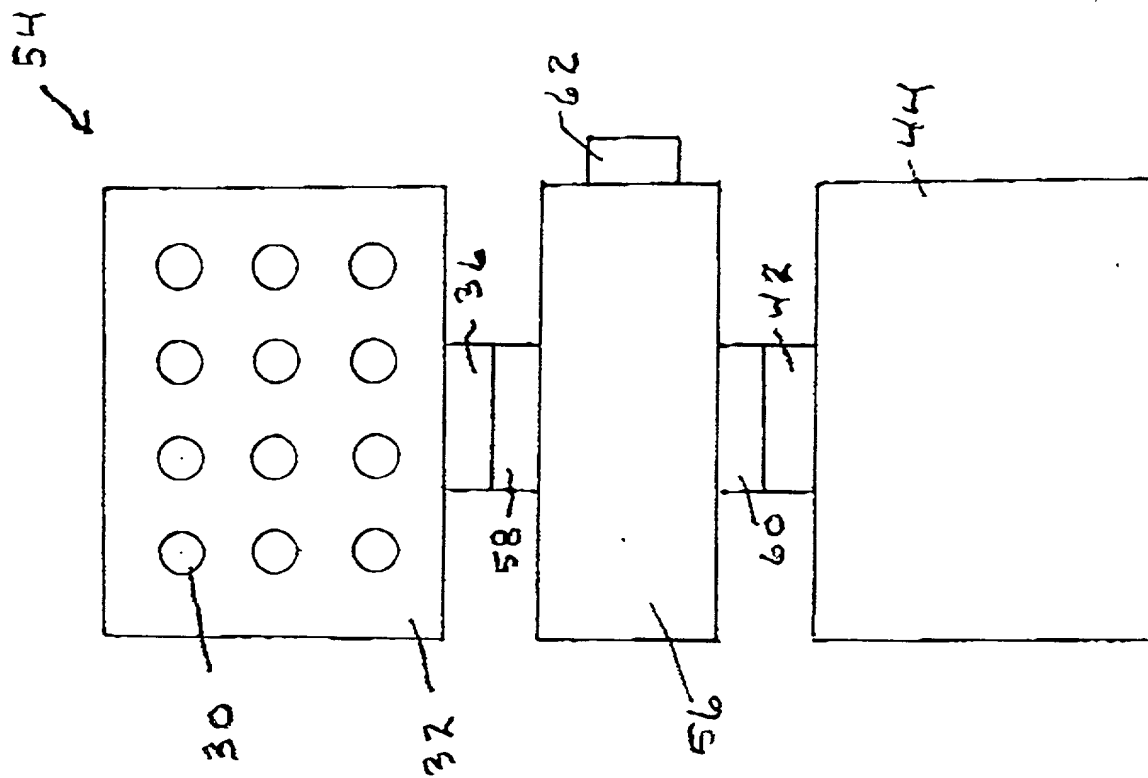


FIG. 4



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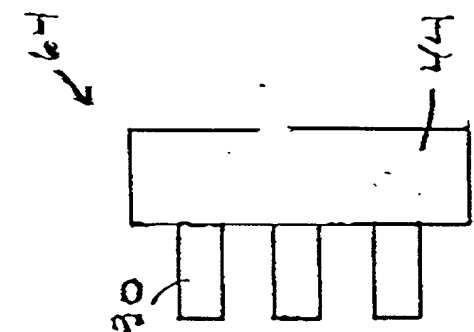


FIG. 7

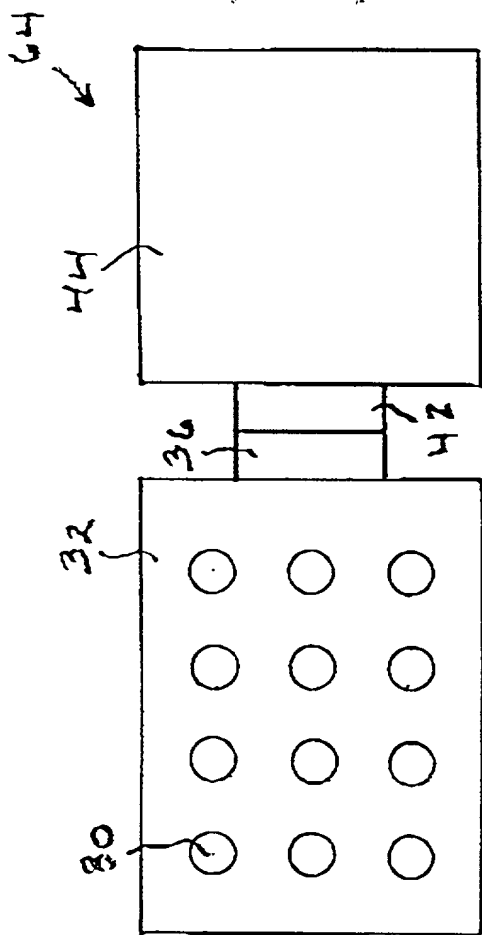


FIG. 6

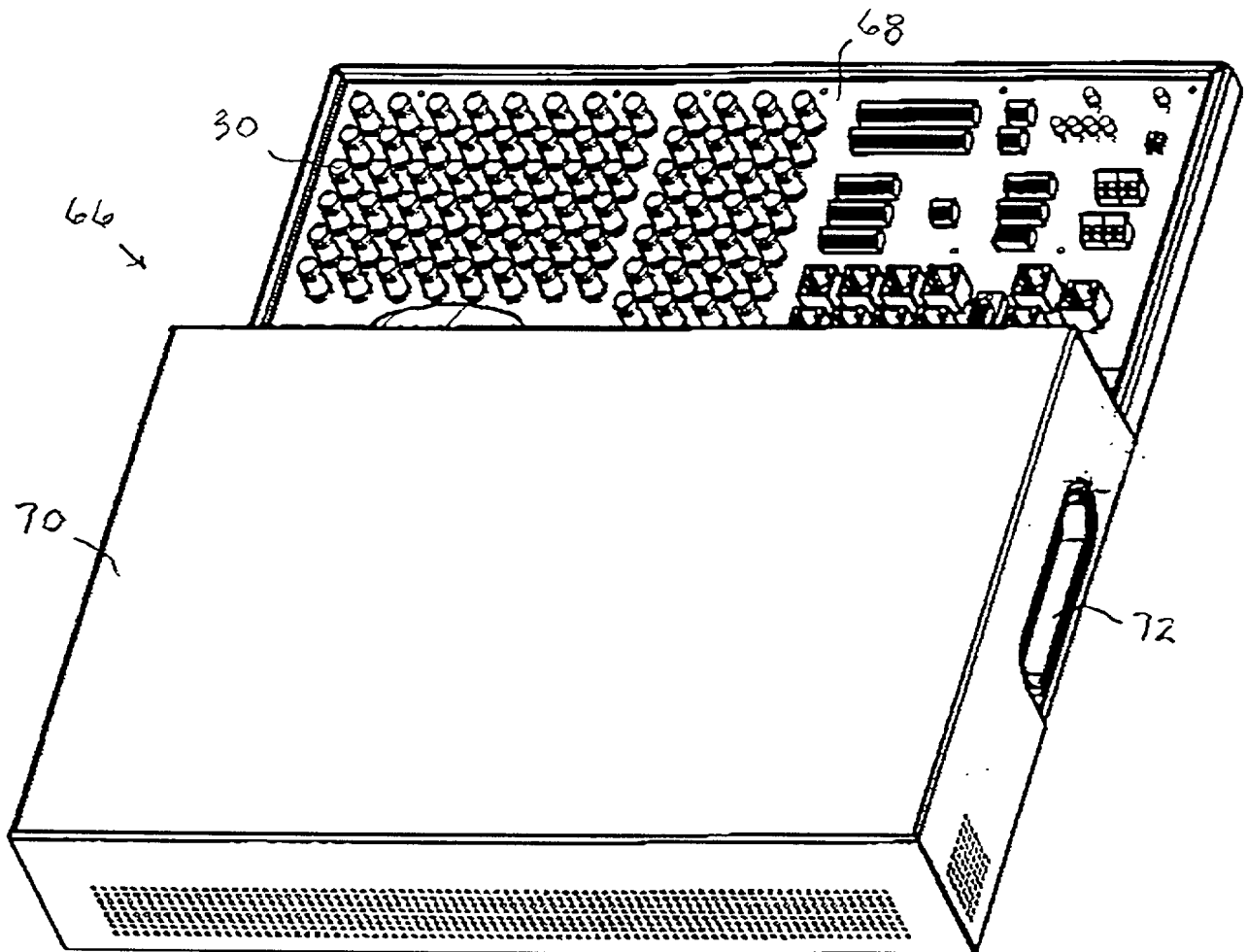


FIG. 8

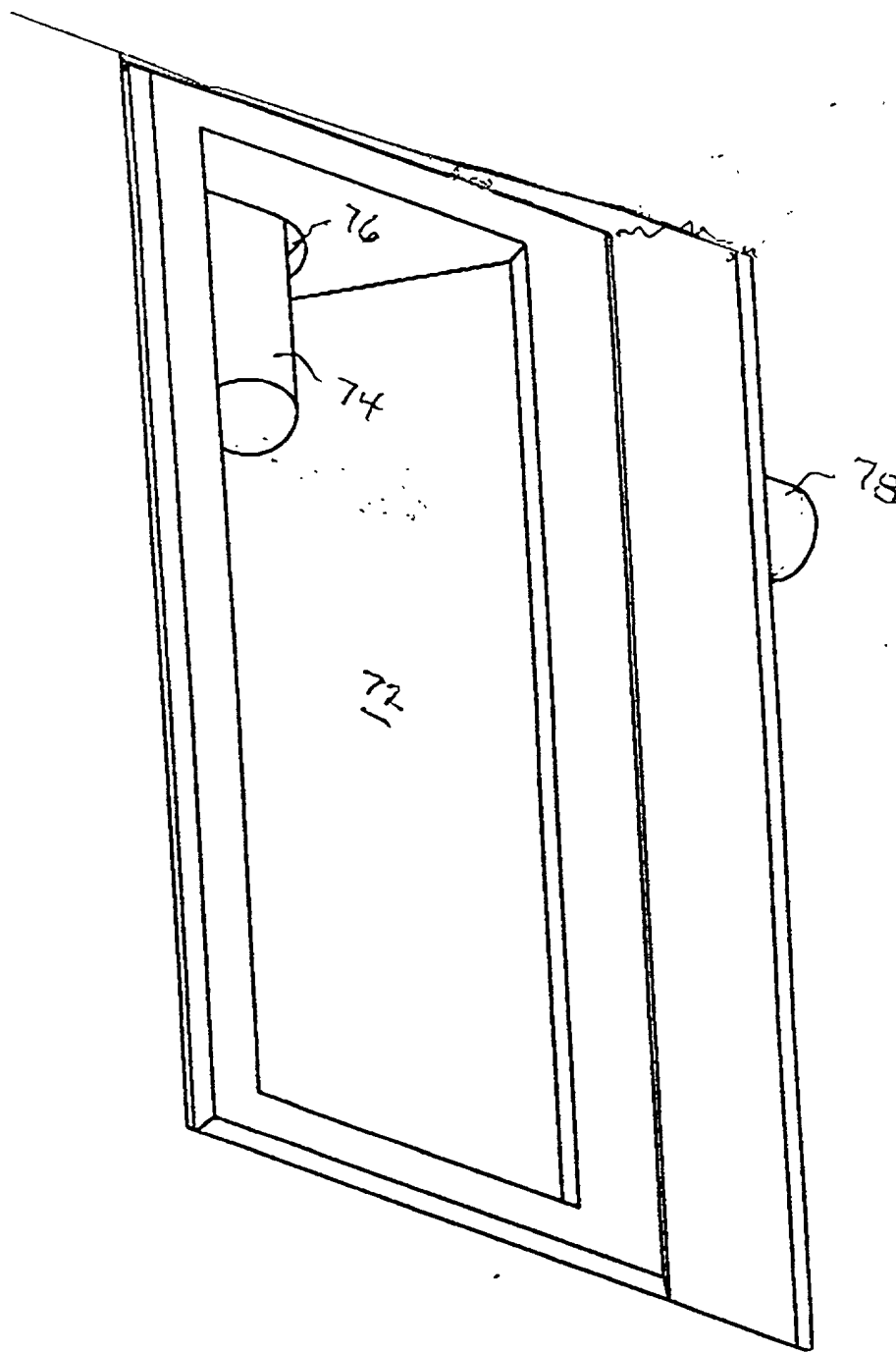


FIG. 9(a)

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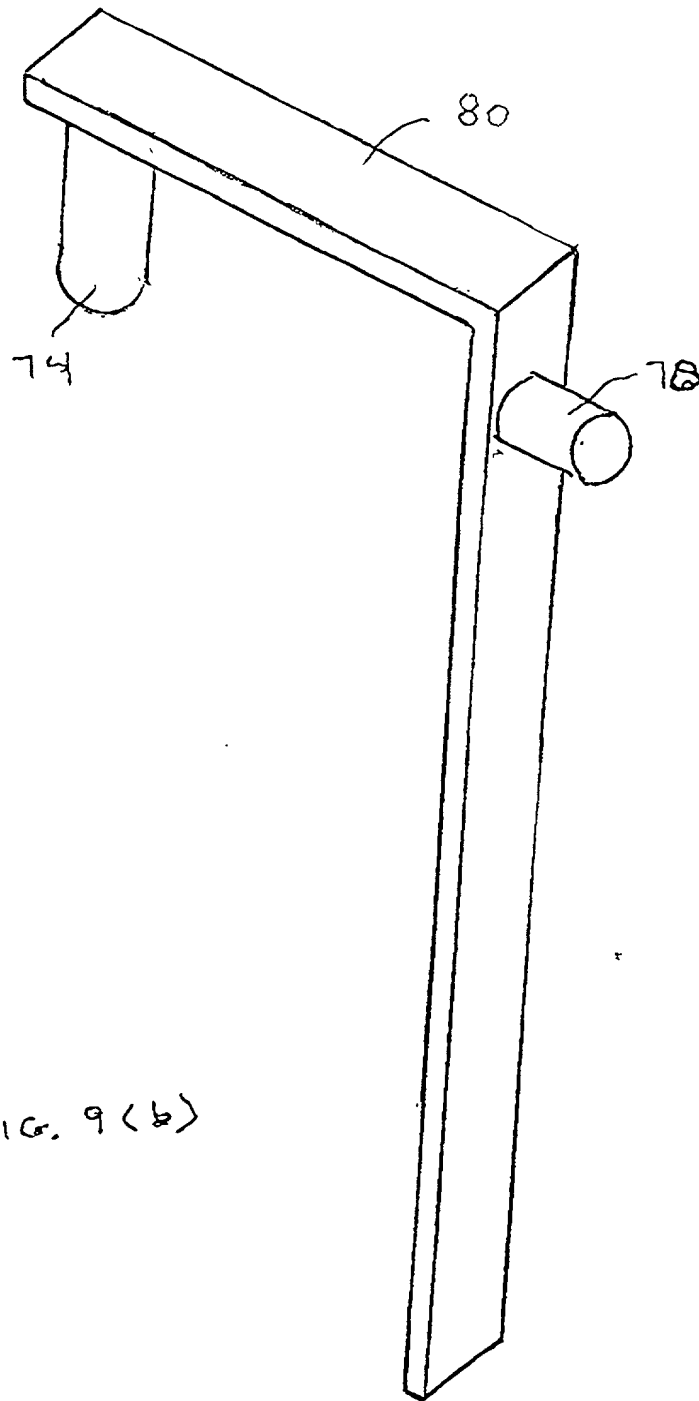


FIG. 9(b)

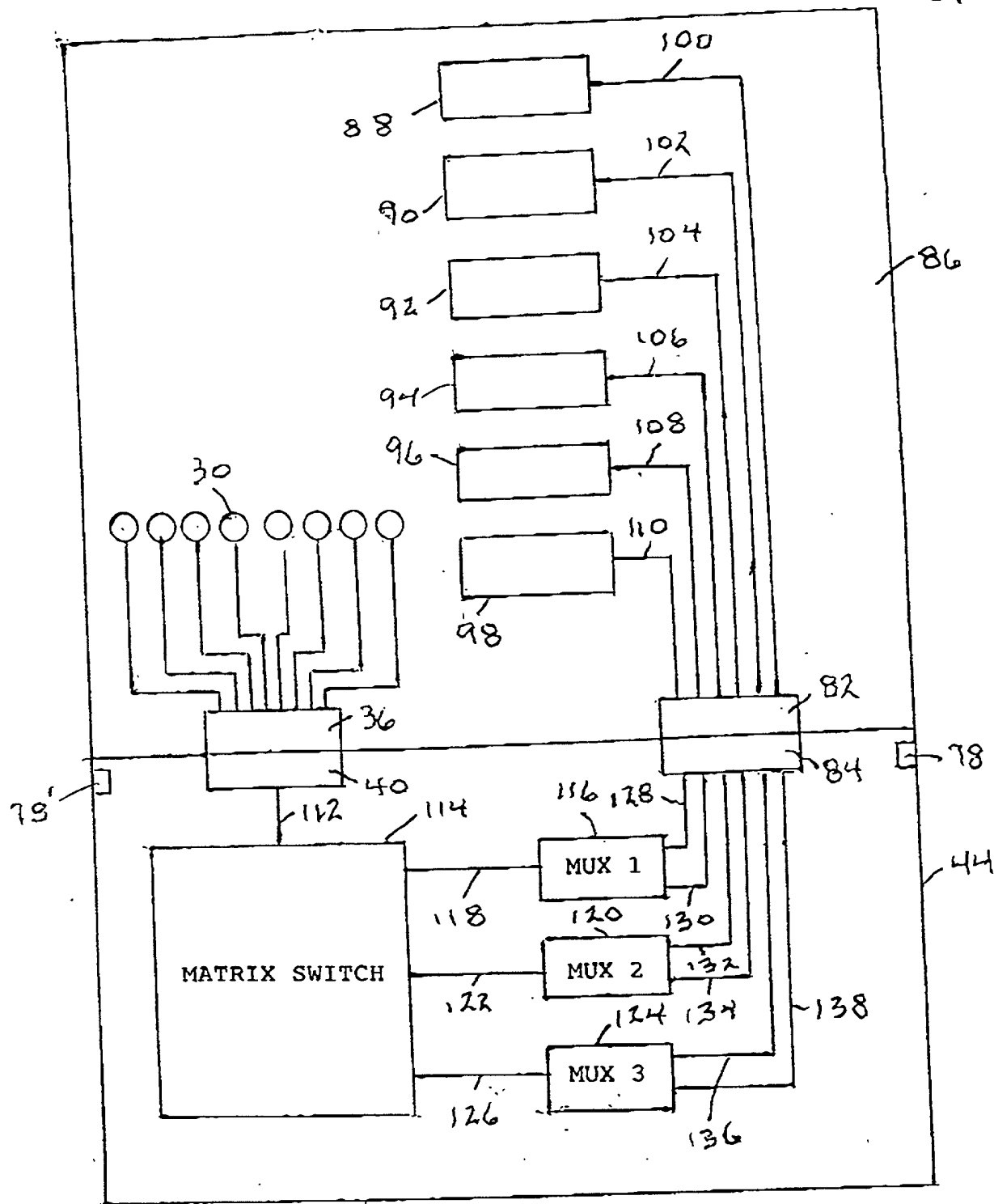


FIG. 10

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## PATENT

## DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

**As a below named inventor, I hereby declare that:**

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

## CONNECTION APPARATUS FOR CCTV SYSTEMS

the specification of which: (check one)

X is attached hereto.

\_\_\_\_\_ was filed on \_\_\_\_\_  
under Attorney's Docket Number \_\_\_\_\_  
as Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 CFR 1.56.

I hereby claim the benefit of foreign priority under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application the priority of which is claimed:

**Prior Foreign Application(s):**

Priority Claimed

\_\_\_\_\_  
(Number)                      (Country)                      (Filing Date)                      Yes No

I hereby claim the benefit of United States priority under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information material to

the patentability of this application as defined in 37 CFR 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

---

(Application Serial #)

---

(Filing Date)

---

(Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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